

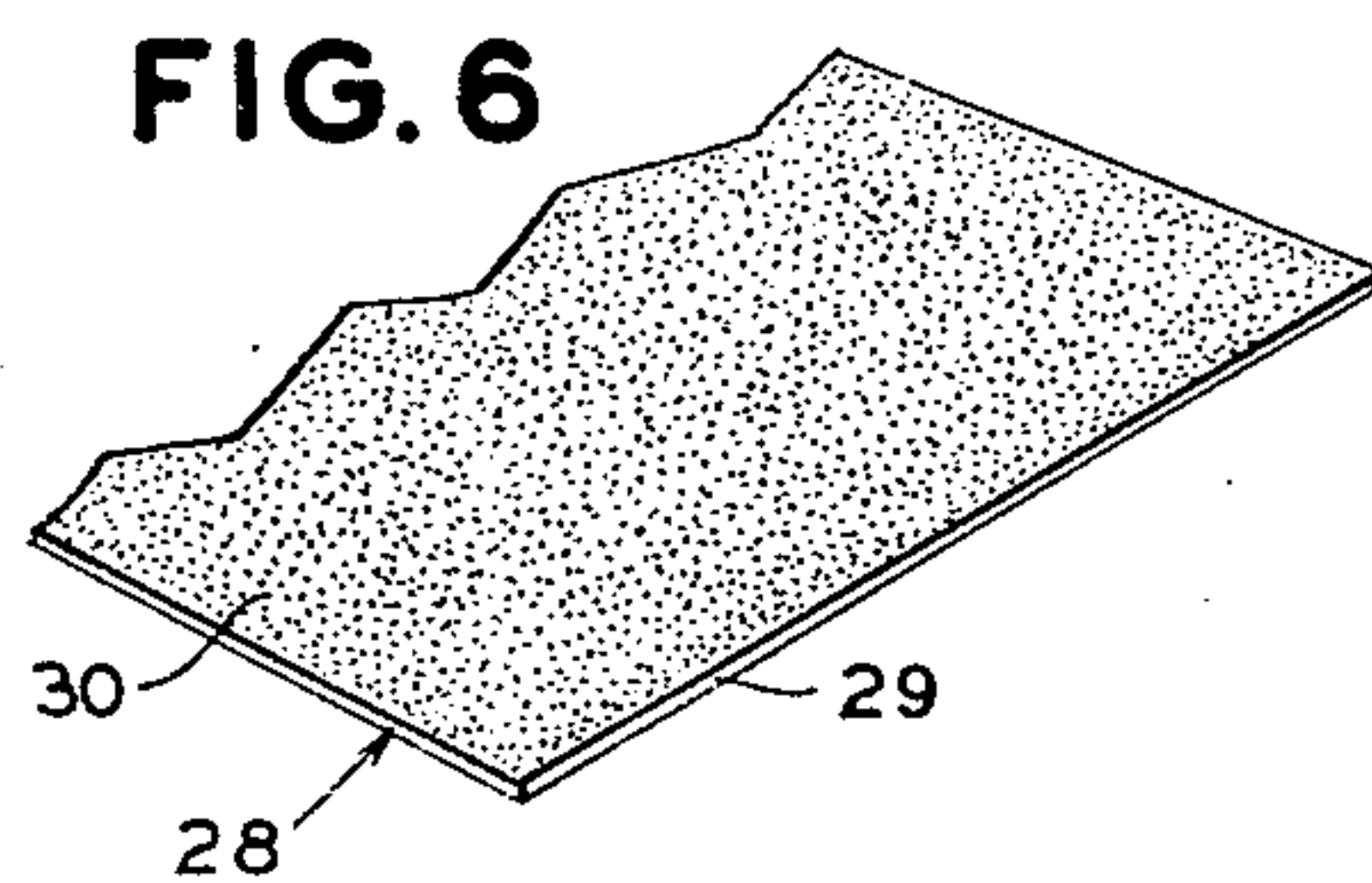
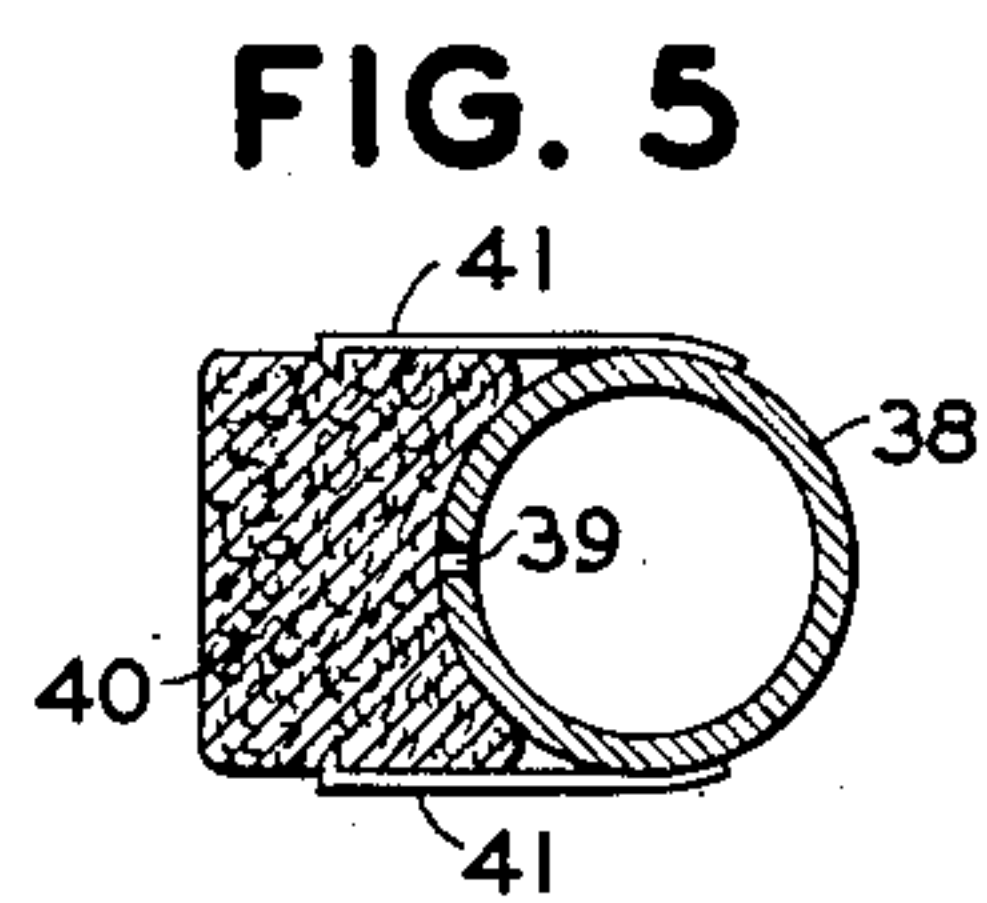
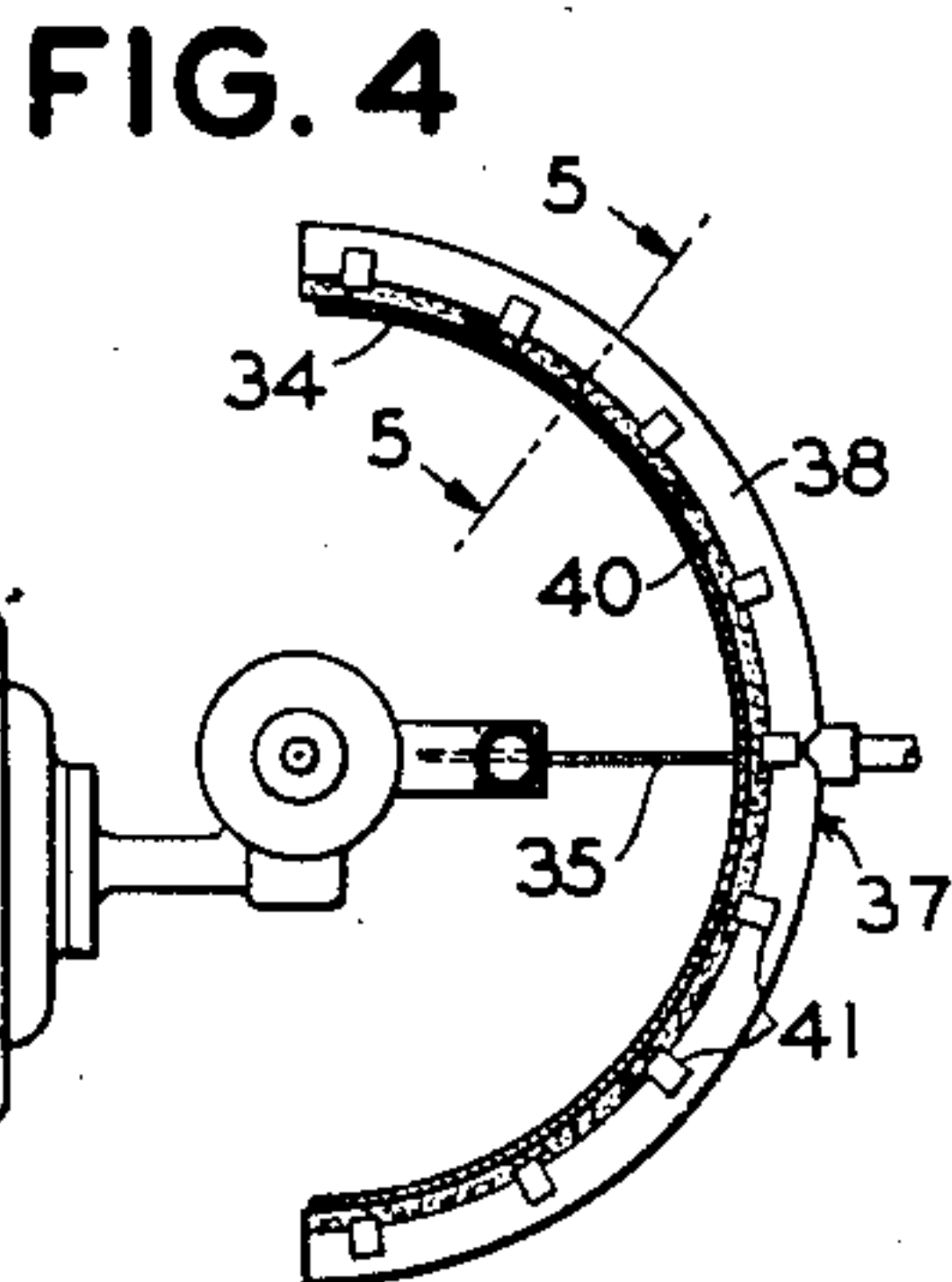
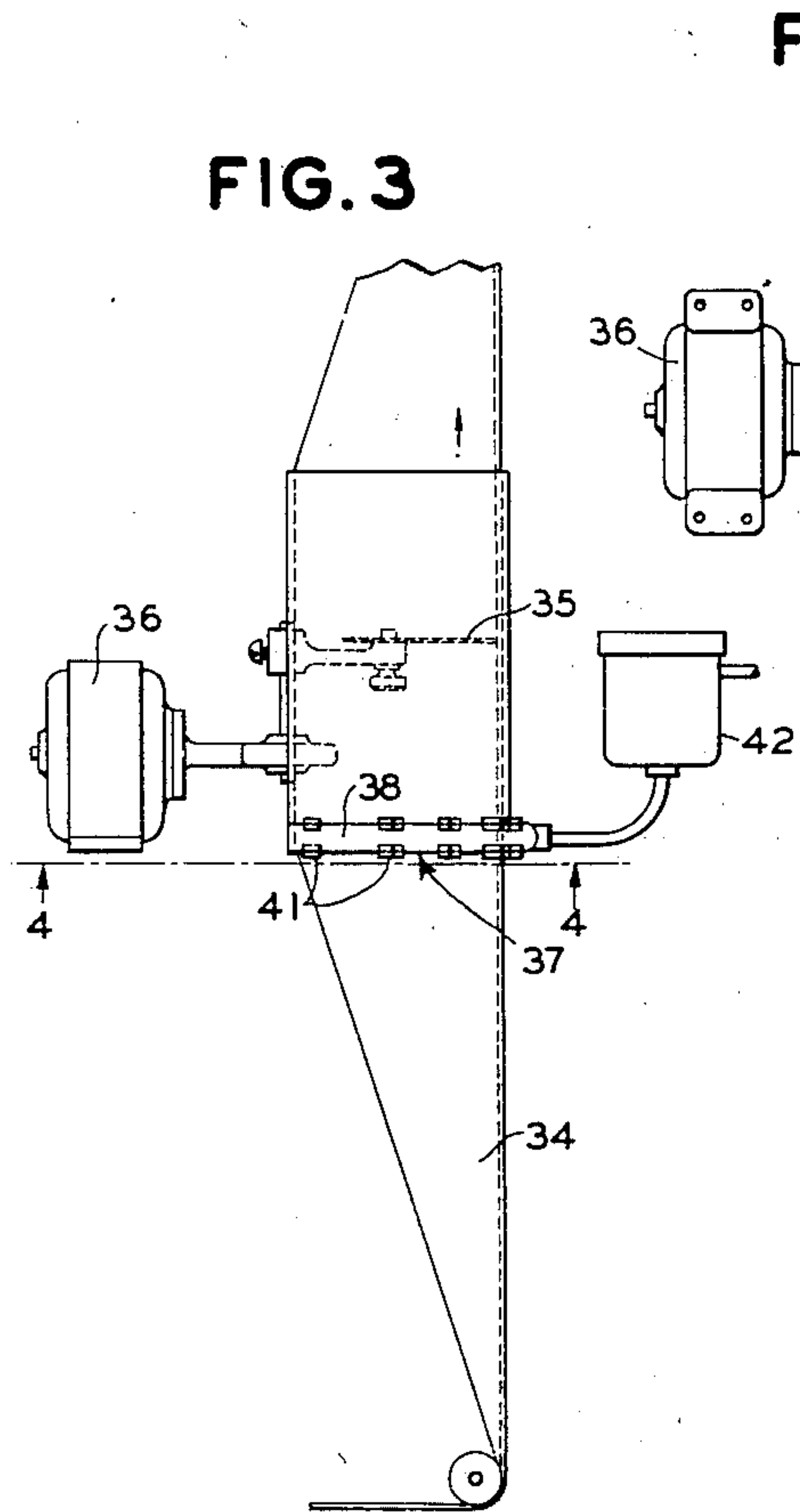
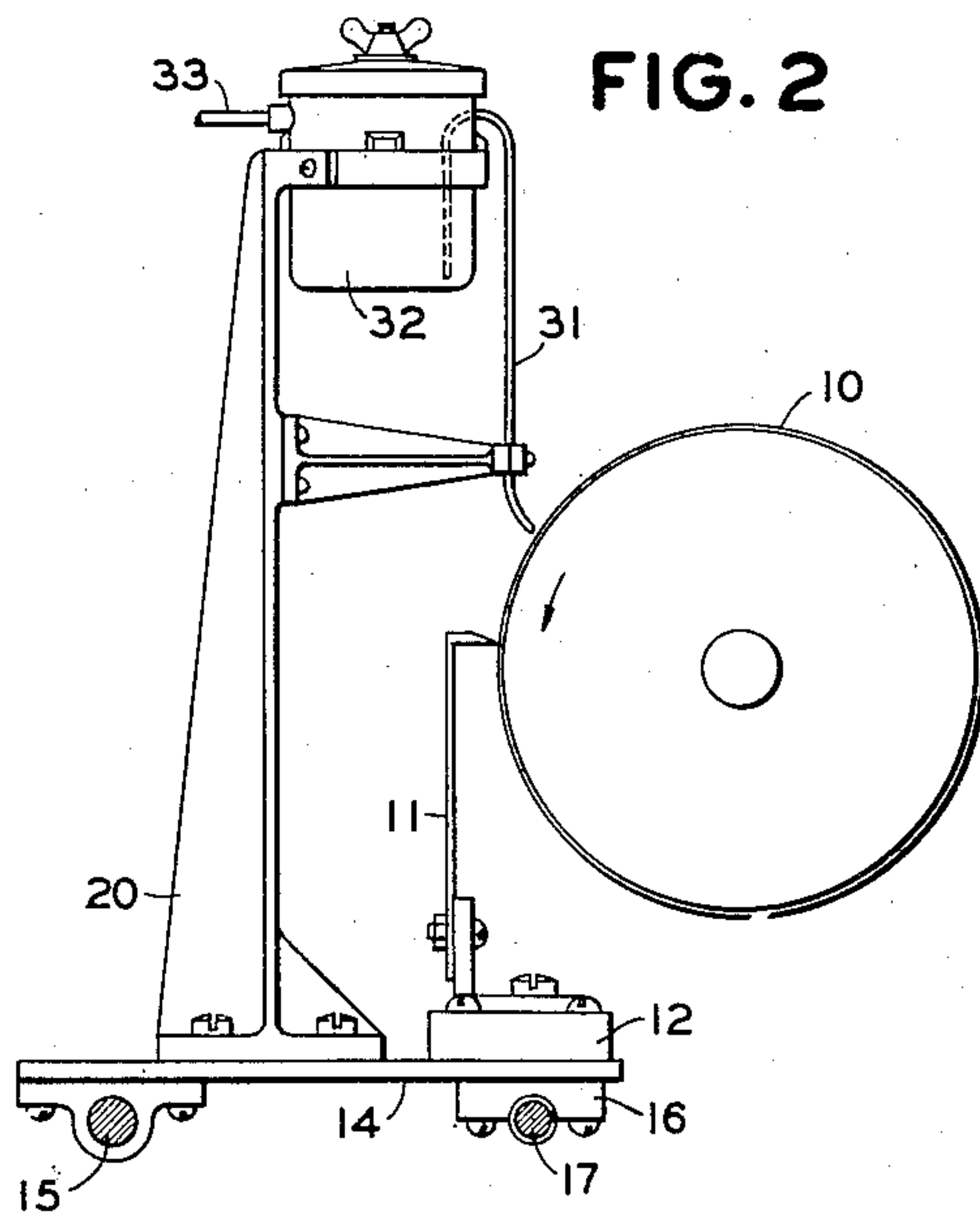
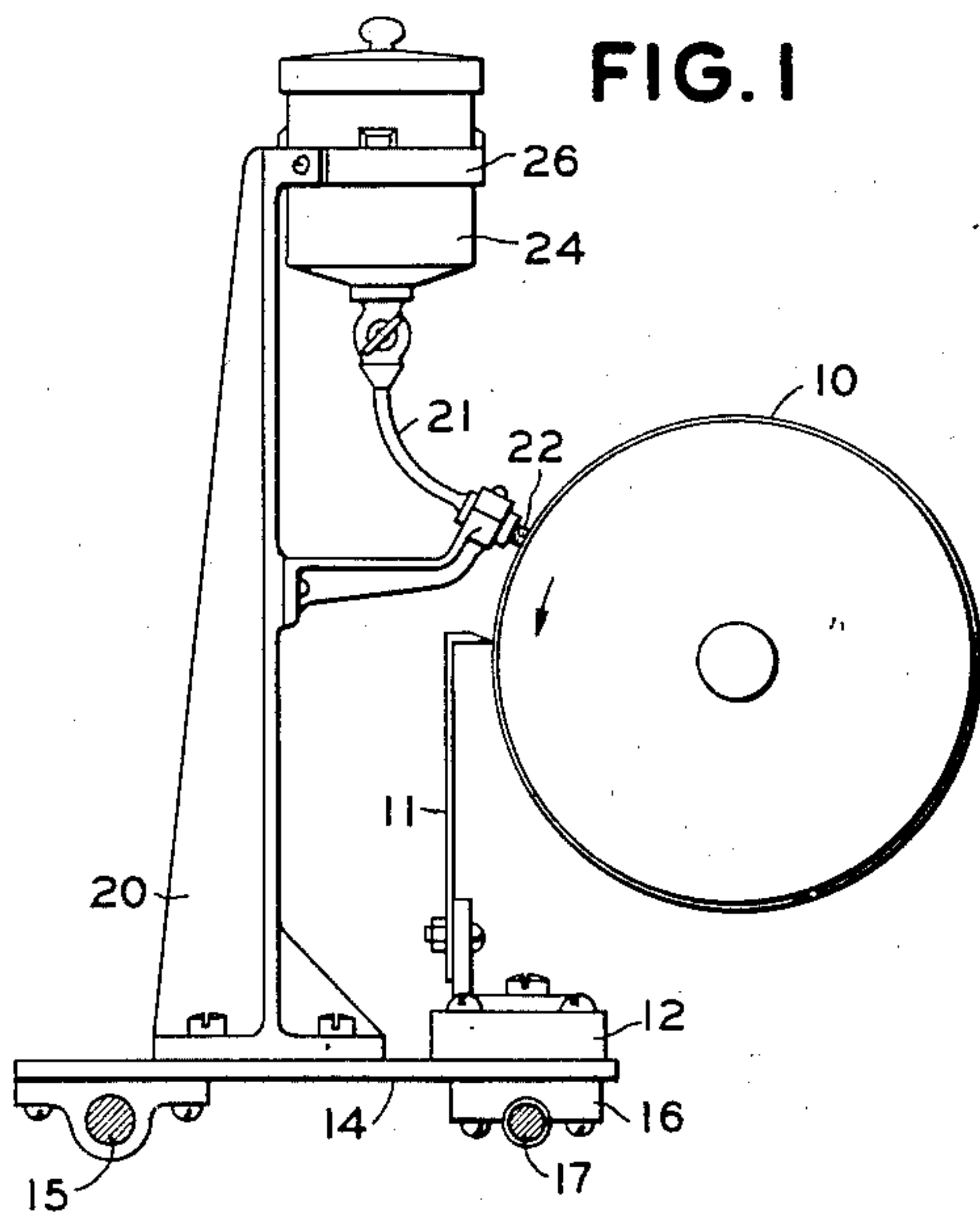
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2,181,533

METHOD OF AND MEANS FOR RECORDING SIGNALS ELECTRICALLY

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METHOD OF AND MEANS FOR RECORDING
SIGNALS ELECTRICALLY

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9 Claims. (Cl. 178—62)

The present invention relates to methods of
and means for producing visible marks on a rec-
ord surface and more particularly to novel meth-
ods of and means for reception of facsimile and
picture records over communication channels.

Telegraphic receiving papers of the prior art
which cannot be used dry but must be substan-
tially saturated with water prior to use are un-
satisfactory for the reason that the surface fibres
separate from the body of the paper and tend to
interfere with the recording instrumentality and
they do not dry readily. Receiving apparatus
designed for use with these prior art wet papers
are equipped with special arrangements for wet-
ting the paper and also for handling the paper
in the wet condition after application of the wa-
ter. Recording blanks produced in accordance
with the present invention are entirely free of
the above enumerated and other disadvantages
attending the use of previously known moist re-
cording blanks.

In accordance with the present invention, a
sheet or layer of paper or other fibrous mate-
rial is coated, impregnated or otherwise supplied
with a color changing medium and, if neces-
sary, a substance which becomes conductive
when moistened with a non-aqueous volatile sol-
vent. The dry electrolytes, of which examples
are given hereinafter, may be applied to the sheet
either in the dry state by coating, or in the wet
state by impregnating the sheet with a solu-
tion and subsequently drying, or it may be ap-
plied in solution in the volatile solvent when the
sheet is used for recording. Accordingly, a ma-
jor object of the present invention is to provide
a novel telegraphic recording blank which is con-
ditioned for use by moistening with a non-
aqueous volatile solvent.

A further object of the invention is to provide
novel recording means to permit use of greatly
simplified recording apparatus of the type em-
ploying a moistening device for the record sheet.

Another object of the present invention resides
in the provision of novel moistening means for
a record blank in telegraphic and like recording
apparatus.

Still another object is to provide a recording
blank adapted to be moistened within successive
areas of limited extent as recording proceeds.

The foregoing and more specific objects will
appear in the following complete disclosure of
the invention in its several aspects.

Referring to the drawing:

Fig. 1 is a view in side elevation of cooperat-

ing parts of a recorder suitable for use in prac-
ticing the present invention;

Fig. 2 is a view similar to Fig. 1 illustrating a
modification;

Fig. 3 is a side elevational view of a continu-
ous type of recorder embodying the present in-
vention in a modified form;

Fig. 4 is a plan view partly in section of the
apparatus disclosed by Fig. 3;

Fig. 5 is an enlarged section taken on the line
5—5 of Fig. 4; and

Fig. 6 is a perspective view of a receiving blank
embodying the present invention, the thickness
thereof being exaggerated for the sake of clear-
ness.

Referring for the present to Fig. 1 of the
drawing, reference character 10 denotes a cyl-
inder which is adapted to receive a record blank
in contact with its periphery. The cylinder 10
is supported and rotated in any suitable manner,
for example, by the means disclosed in the ap-
plication of Raleigh J. Wise et al., Ser. No.
23,927, filed May 28, 1935. A recording stylus 11
is supported upon a member 12 preferably of in-
sulating material, and the member 12 in turn
is supported upon a carriage 14. The carriage
14 slides along a guide 15 and is preferably piv-
oted to the guide so as to permit the stylus 11
to be readily raised when it is desired to in-
terrupt the recording operation. The carriage 14
is provided with an internally threaded mem-
ber 16 which is engaged over a threaded shaft 17,
the latter being driven from the cylinder 10. The
guide 15 and the threaded rod 17 are so posi-
tioned with respect to each other that when the
stylus 11 is raised from the surface of the cylin-
der 10, the driving action of the threaded rod 17
on the member 16 supported thereby is inter-
rupted, arresting advance of the carriage 14.
Secured upon the carriage 14 is a bracket 20
which is provided with a lateral extension serv-
ing to receive and position a conduit 21, the free
end of the conduit being supported adjacent the
periphery of cylinder 10. Inserted in the end
of the conduit 21 is a block 22 of suitable ab-
sorbent material such as felt, which serves to
moisten the surfaces of the blank as the cylinder
10 is rotated. The conduit 21 is in communi-
cation with a suitable reservoir 24 which is car-
ried by or rests upon a band 26 secured to the
bracket 20. It will be understood that the re-
cording device comprising the cylinder 10, car-
riage 14 and the supporting and the driving de-
vices for the carriage may be of any suitable or
desired structure. A receiver of the type in

which the cylinder itself is advanced axially past a fixed recording device may be used.

The recording blank 28 disclosed in Fig. 6 of the drawing may be of a form suitable for application to the cylinder 10 or it may be a continuous sheet or web useful in an apparatus of the type disclosed in Fig. 3. This blank comprises a body portion 29 of paper or like fibrous material which is preferably porous and possesses other desired properties. The fibrous body of the blank is preferably coated or impregnated with a material indicated by reference numeral 30 which will change its color upon exposure to an electric potential or passage of an electric current. Such color changing substances, for example, are lead thiosulphate; a material having a plurality of allotropic forms such as mercuric sulphide, mercuric iodide, or mercuric oxide; and lead thiocyanate. The blank which has been coated or impregnated with a color changing material such as one of those disclosed, is rendered conducting by moistening it with an alcohol after a certain desired alcohol soluble salt is applied.

Salts of sodium, potassium, and ammonium, preferably their iodides, sulpho-cyanides, bromides, chlorides and nitrates, form conductive solutions in alcohols. Other inorganic salts and organic compounds are also conductive in non-aqueous solution and their use in the manner disclosed is within the scope of the present invention. We have discovered that the solubility of the salts enumerated above can be employed in preparing a recording paper which can be made conductive without moistening the paper with water, as the solubility of these salts in a volatile solvent such as an alcohol, makes possible their use.

Depending upon the circumstances encountered when a record is to be made in practicing the invention, an alcohol may be selected from a large group having the desired properties such as volatility, a flash point sufficiently high so that fire and explosion hazards are eliminated, and a minimum of residual odor. In general, for higher recording speeds, alcohols of higher evaporation rate are preferred.

Suitable alcohols, for example, are normal butyl, normal propyl, iso-butyl and iso-propyl alcohols. Other suitable alcohols are amyl alcohol and higher alcohols, although their solvent action becomes less on the salts preferred. Methyl or ethyl alcohols which are highly volatile may be also mixed for use with any of the alcohols mentioned above.

The corresponding ketones, aldehydes and mono-substituted esters of di-hydric alcohols also are available as solvents for the salts above referred to.

In practicing the invention either of two methods, equally satisfactory, may be followed. The body 29 of the blank may first be impregnated with any one of the salts named above either during manufacture or after manufacture in a water or alcohol solution. Before or after this impregnation with any one of the desired salts, and preferably before their application, a color changing material is put in or upon the fibrous body 29. The recording blank thus prepared is dry, may be readily handled, and is ready for use in a facsimile or other recorder provided with suitable moistening means.

The second method of preparing a blank is to have the body 29 provided with the color changing material. If the color changing mate-

rial is on the surface, it may be a powdered coating suspended in a binder or an ink film. In any event this coating of color changing material must be affixed to the body of the blank so that it will remain upon the said body and resist removal by the alcohol. The blank 28 thus treated with the color changing material is used on the recorder and a solution of one of the above named electrolytes in one of the enumerated alcohols or alcohol derivative is applied locally ahead of the stylus as by the absorbent wick 22.

In operation of the recorder, the reservoir 24 is provided with a quantity of desired solvent or, if the second method of practicing the invention is used, with a solution of the desired salt in any one of the alcohols stated to be suitable. The pad or wick 22 can be of very small area and is placed in such a manner that the surface of the blank is moistened only sufficiently in advance of the stylus so that the salt will enter into solution as the recording proceeds. The readily volatile solvent evaporates, leaving the blank dry shortly thereafter. At no time is the blank or any part thereof soggy and weakened in tensile strength.

Referring now to Fig. 2 of the drawing, the cylinder 10 and the carriage 14 are similar to those described in connection with Fig. 1 and are therefore designated by the same reference characters. The liquid, however, is applied to the surface of the recording blank in a manner which differs from that of Fig. 1 inasmuch as the absorbent member 22 is omitted. Application of the liquid is accomplished by means of a capillary tube 31. This capillary tube extends into the closed reservoir 32 which is in communication through the conduit 33 with a source of fluid under pressure such as an air compressor to assist in ejecting the contents of the reservoir 32 through the relatively minute opening in the capillary tube 31. If the internal passage in the tube 31 may rest lightly in contact with the reservoir 32 may be open, in which case tube 31 will act as a syphon and deposit a supply of liquid continuously upon the record surface. The tube 31 may rest lightly in contact with the surface of the recording blank upon the cylinder 10 or it may be spaced slightly therefrom as shown so that the solvent is applied in the form of a very fine stream or spray.

The operation of this embodiment will be readily understood from the foregoing description of the structure and operation of the apparatus disclosed in Fig. 1.

Figs. 3, 4 and 5 of the drawing show a receiving apparatus of the continuous type in which the blank is in the form of a continuous web or sheet 34. The said web or sheet is prepared for use in the recorder in accordance with the procedure outlined above in connection with the description of the blank 28. The web 34 is curved at the point where the record is impressed upon it to permit thereon operation of a revolving stylus or a plurality of styli 35, which is energized in accordance with the received signals and is driven by a motor or other mechanical driving means 36.

In advance of the point where the web 34 is acted upon by the recording stylus, there is located a device 37 for applying the solvent. The device 37 may conveniently be made up from a length of conduit in the form of a standard pipe 38 which is curved to arcuate form and is provided with a series of apertures 39 to permit

escape of fluid from the interior of the pipe into a pad or block 40 of suitable absorbent material. The block of absorbent material 40 is held in contact with the pipe 38 opposite the series of openings 39 by means such as the clips 41 which firmly engage the pad 40 but permit its removal and replacement when desired. The interior of the pipe or conduit 38 is in communication with a reservoir 42, which is preferably of the kind described in connection with Fig. 2, whereby fluid may be ejected into the pad 40 under pressure insuring an equal distribution of the fluid over the surface of the curved web 34. It is to be noted that the pad 40 may serve as a guide for the paper web 34 to assist in giving it a curved form so that it will present every part of its surface to action of the stylus 35. It will be understood that the absorbent material represented by the pad 40 in Fig. 3 may be in contact with the record blank on the surface thereof contacted by the stylus or on the side opposite the stylus as shown.

From the foregoing complete disclosure of the invention in its several aspects, it will be seen that there is provided a recording method and means which permits simplification of the moistening apparatus and recorder and also avoids all objectionable features of prior recording methods and apparatus wherein it is necessary to saturate the body of the recording blank with water or aqueous solutions.

The nature of the invention will be determined from the foregoing and the scope thereof is defined in the appended claims.

We claim:

1. A recording blank comprising a sheet of fibrous material, an adherent coating on said sheet of a recording substance which has the property of being marked by passage of electric current through the coating, and a substance which forms an electrolyte when dissolved in a non-aqueous solvent, distributed in the body of said sheet.

2. The method of recording telegraphic signals which comprises applying as a coating to a record blank a quantity of material adapted to be marked upon passage of an electric current through said coating, adding a quantity of a dry electrolyte soluble in a non-aqueous solvent to the blank and during recording applying a non-aqueous solvent to said blank and thereafter selectively passing an electrical current through elemental areas of said coated blank.

3. The method of recording telegraphic signals which comprises applying to a record blank a quantity of material which has the property of being marked by passage of electric current therethrough uniformly distributed over the surface of said blank, distributing through the body

of said blank a quantity of a dry electrolyte soluble in a highly volatile non-aqueous solvent and during recording applying said solvent to successive limited areas of said blank and thereafter selectively passing an electrical current through the limited areas of said blank.

4. The method of recording telegraphic signals which comprises applying to a record blank a coating of a quantity of a material which has the property of being marked by passage of electric current therethrough and during recording selectively applying a non-aqueous electrically conducting solution of a salt to elemental areas of the blank and thereafter passing an electrical current through said elemental areas of said blank.

5. The method of recording telegraphic signals which comprises applying to a record blank a quantity of material which has the property of being marked by passage of electric current therethrough uniformly distributed over the surface of said blank and during recording selectively applying a non-aqueous electrically conducting solution of a salt to successive elemental areas of said blank and thereafter passing an electrical current through said elemental areas of said blank.

6. A recording blank comprising a support, said support bearing a recording medium adapted to be marked by the passage of electric current through the blank and being impregnated with a material having the property of conducting electricity upon moistening with a non-aqueous solvent.

7. A recording blank comprising a sheet of fibrous material, an adherent coating substance adapted to be marked by passage of current through said blank on said sheet, and sodium nitrate distributed in the body of said sheet whereby said sheet is rendered electrically conductive upon application of an alcohol thereto.

8. A recording blank comprising a sheet of fibrous material, an adherent coating substance adapted to be marked by passage of current through said blank on said sheet, and ammonium nitrate distributed in the body of said sheet whereby said sheet is rendered electrically conductive upon application of an alcohol thereto.

9. A recording blank comprising a sheet of fibrous material, an adherent coating substance adapted to be marked by passage of current through said blank on said sheet, and a dry electrolyte soluble in an alcohol distributed in the body of said sheet whereby said sheet is rendered electrically conductive upon application of an alcohol thereto.

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